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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/586,050 06/02/00 BOLKEN

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

**Office Action Summary**

Application No.

09/586,050

Applicant(s)

BOLKEN ET AL.

Examiner

Thanh Y. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other:

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 9, 11-20, 25, 27-36, 41, 43-48, 53-60, and 62-63 are rejected under 35 U.S.C. 102(e) as being anticipated by Mostafazadeh et al. (U.S. 5,783,870).

As to claim 1, Mostafazadeh et al. discloses a system (see Figs. 5, 6 and 7H) comprising: a processor (“microprocessor”); and a memory device (“ROM/ROM BIOS” and “RAM FORM”) operatively coupled to the processor (404) (as shown in Fig. 5), the memory device (“ROM/ROM BIOS” and “RAM FORM”) comprising a plurality of vertically stacked ball grid arrays (see Figs. 5, 6, and 7H), each ball grid array having a memory chip (see Figs 5, 6 and 7H).

As to claim 2, Mostafazadeh et al. discloses a system (see Figs. 5, 6 and 7H) wherein the vertically stacked ball grid arrays (Fig. 7H) comprise: a plurality of packages [100(1) - 100(4)], each of the plurality of packages physically coupled to another of the plurality of packages; and a plurality of memory chips (see Fig. 6, elements 32), each of the plurality of memory chips (32) physically coupled to a respective one of the plurality of packages (see Figs. 5 and 7H).

As to claim 3, Mostafazadeh et al. discloses a system (see Figs. 5, 6 and 7H) wherein each package comprises: a molded resin body (see Fig. 7D, element 118) having a die side and a wire side (116) (see Fig. 7D, elements 110, 116 and 118).

As to claim 4, Mostafazadeh et al. discloses a system (see Figs. 5, 6 and 7H) wherein each package comprises: a plurality of first alignment features on the die side of the package; and a plurality of second alignment features on the wire side of the package (see Figs. 7F, 7G and 7H, element 103).

As to claim 9, Mostafazadeh et al. discloses the plurality of first alignment features and the plurality of second alignment features orient adjacent packages in a unique location (see Fig. 7H).

As to claim 11, Mostafazadeh et al. discloses a system wherein the plurality of first alignment features and the plurality of second alignment features comprising of at least one unique alignment feature (see Fig. 7H).

As to claim 12, Mostafazadeh et al. discloses a system wherein the plurality of first alignment features and the plurality of second alignment features support adjacent packages [100(1)-100(4)] during solder ball reflow (see Fig. 7H, col. 5, lines 33-40).

As to claim 13, Mostafazadeh et al. discloses a system wherein each of the plurality of packages is electrically coupled to another of the plurality of packages using solder balls (see Fig. 7H, elements 100(1)- 100(4) and 120)

As to claim 14, Mostafazadeh et al. discloses a system wherein each of the plurality of packages comprise vias (see Figs. 3A-3B, elements 50) extending therethrough to connect solder balls (see Fig. 4B, element 40) of adjacent packages serially.

As to claim 15, Mostafazadeh et al. further discloses a memory board (see Figs. 4A, 5, 6 and 7H) comprising: a substrate (60); and a memory device (Fig. 4A, element 32) operatively

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coupled to the substrate (60), the memory device (32) comprising a plurality of vertically stacked ball grid arrays (42), each ball grid array having a memory chip.

As to claim 16, Mostafazadeh et al. discloses a memory board (see Figs. 4A, 5, 6 and 7H) wherein the substrate is a printed circuit board (Figs. 4A and 5, element 60; col. 5, lines 43-55).

As to claim 17, Mostafazadeh et al. discloses a memory board (see Figs. 4A, 5, 6 and 7H) comprising a memory controller operatively coupled to the memory device and to the substrate (see Fig. 4A, element 46, col. 4, lines 5-30).

Claims 18-20 recite limitations similar to claims 2-4. Therefore, they are rejected for the same reasons.

Claims 25 and 27-30 recite limitations similar to claims 9 and 11-14. Therefore, they are rejected for the same reasons.

As to claim 31, Mostafazadeh et al. discloses a memory board wherein a first ball grid array is coupled to a second ball grid array (see Figs. 5-6 and 7H).

As to claim 32, Mostafazadeh et al. discloses a memory board wherein the first ball grid array is serially coupled to the second ball grid array (see Figs. 5-6).

As to claim 33, Mostafazadeh et al. discloses a stacked ball grid array (see Fig. 7H).

As to claims 34-36, they recite limitations similar to claims 2-4. Mostafazadeh et al. further discloses a stacked ball grid array (Fig. 7H). Therefore, claims 34-36 are rejected under the same rationales.

Claim 41 recites limitations similar to claim 9. Mostafazadeh et al. further discloses a stacked ball grid array (Fig. 7H). Therefore, claim 41 is rejected under the same rationales.

Claims 43-46 recite limitations similar to claims 11-14. Mostafazadeh et al. further discloses a stacked ball grid array (Fig. 7H). Therefore, claims 43-46 are rejected under the same rationales.

As to claim 47, Mostafazadeh et al. discloses a device (Fig. 7H) comprising: a chip; and a package (100(4)) operatively coupled to the chip, the package comprising: a first side; a second side (see Fig. 7H); a plurality of first alignment features (119) on the first side of the package; and a plurality of second alignment features (119) on the second side of the package (see Fig. 7H).

Claim 48 recites limitations similar to claim 3. Therefore, it is rejected for the same reasons.

Claim 53 recites limitations similar to claim 2. Therefore, it is rejected for the same reasons.

Claim 54 recites limitations similar to claim 47. Therefore, it is rejected for the same reasons.

Claim 55 recites limitations similar to claim 3. Therefore, it is rejected for the same reasons.

Claim 60 recites limitations similar to claim 9. Therefore, it is rejected for the same reasons.

Claims 62-63 recite limitations similar to claims 11-12. Therefore, they are rejected for the same reasons.

*Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5-8, 10, 21-24, 26, 37-40, 42, 49-52, 56-59, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mostafazadeh et al (U.S. 5,783,870).

As to claims 5-8, Mostafazadeh et al. is silent disclosing a system (see Figs. 5, 6 and 7H) wherein the plurality of first alignment features are male and the plurality of second alignment features are female; and wherein the plurality of first alignment features are male and the plurality of second alignment features are male, wherein the plurality of first alignment features are female and the plurality of second alignment features are male; wherein the plurality of first alignment features are female and the plurality of second alignment features are female. However, it would have been an obvious matter of design choice to one of ordinary skill in the art to use different kinds of connectors such as male and female connectors aligned on each first or second alignment of the package depend upon the other package's connectors to be connective [In re Leshin, 125 USPQ 416].

As to claim 10, Mostafazadeh et al. does not disclose a system wherein the plurality of first alignment features and the plurality of second alignment features are arranged asymmetrically. The limitations of the plurality of first alignment features and the plurality of second alignment features are arranged asymmetrically would have been obvious to one of

ordinary skill in the art at the time the invention was made because the skilled artisan will know what size the package should be to match with the first and second alignment features.

Claims 21-24 recite limitations similar to claims 5-8. Therefore, they are rejected for the same reasons.

Claim 26 recites limitations similar to claim 10. Therefore, they are rejected for the same reasons.

As to claims 37-40, they recite limitations similar to claims 5-8. Mostafazadeh et al. further discloses a stacked ball grid array (Fig. 7H). Therefore, claims 37-40 are rejected under the same rationales.

Claim 42 recites limitations similar to claim 10. Mostafazadeh et al. further discloses a stacked ball grid array (Fig. 7H). Therefore, claim 42 is rejected under the same rationales.

Claims 49-52 recite limitations similar to claims 5-8. Therefore, they are rejected for the same reasons.

Claims 56-59 recite limitations similar to claims 5-8. Therefore, they are rejected for the same reasons.

Claim 61 recites limitations similar to claim 10. Therefore, it is rejected for the same reasons.



***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kinsman (U.S. 6,172,419), Lee et al. (U.S. 6,050,832), Behlen et al. (U.S. 5,598,033), Yew et al. (U.S. 6,218,202), Londa (U.S. 5,748,452) and Lin (U.S. 5,222,014) disclose Ball Grid Array packages.


**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (703) 305-4757. The examiner can normally be reached on Monday through Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeff Gaffin, can be reached on (703) 308-3301. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TYT

  
**Jayprakash N. Gandhi**  
**Primary Examiner**  
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